

ABSTRACT OF THE DISCLOSURE

Bubble-free electrodes, electrochemical cells including bubble-free electrodes, analytical devices, and methods for preparing and using them are provided. The analytical devices each include at least one bubble-free electrode. Analytical devices that

5 include an electrochemical cell and a sample containment device are also provided, wherein the electrochemical cell includes an anodic reservoir, a cathodic reservoir, an electrical connection between the anodic reservoir and the cathodic reservoir, and a first bubble-free electrode disposed within one of the anodic reservoir and the cathodic reservoir. A second electrode is disposed within the other reservoir and a power source is

10 provided having a positive terminal that is normally in electrical contact with the first electrode, and a negative terminal that is normally in electrical contact with the second electrode. The analytical device further includes a power source polarity-inverting device for switching the contacts between the terminals of the power source and the first and second electrodes. The sample containment device includes a sample containment

15 chamber having an opening for introducing a sample into the chamber and being positioned with respect to the electrochemical cell such that an electrical field generated by the electrochemical cell can influence a property of a component of a sample disposed in the sample containment chamber. Pressure-generating cells are also provided.